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## AMENDMENTS TO THE CLAIMS

1. (Currently amended) A method of fabricating a diffractive optical element (DOE), the method comprising:

reactive ion etching a pattern in a ZnSe polycrystalline substrate ~~by means~~ using a gas consisting of ~~only~~ a chlorine-based gas which does not include a hydrocarbon group; and

forming the DOE from the etched ZnSe polycrystalline substrate.

2. (Currently amended) A method of fabricating a Diffractive Optical Element (DOE), the method comprising:

reactive ion etching a pattern in a ZnSe polycrystalline substrate using a gas consisting of a chlorine-based gas which does not include a hydrocarbon group and inert gas or gas which does not react with ZnSe; and

forming the DOE from the etched ZnSe polycrystalline substrate.

3. (Previously presented) The method according to Claim 2, wherein said inert gas includes Ar.

4. (Previously presented) The method according to Claim 1, wherein said chlorine-based gas includes $BCl_3$ gas.

5. (Previously presented) The method according to Claim 1, comprising

reactive ion etching at a gas pressure of 0.5Pa through 1Pa.

6. (Previously presented) The method according to Claim 1, comprising activating the gas by means of a radio frequency.

7. (Previously presented) The method according to Claim 2, wherein said chlorine-based gas includes $BCl_3$ gas.

8. (Previously presented) The method according to Claim 3, wherein said chlorine-based gas includes $BCl_3$ gas.

9. (Previously presented) The method according to Claim 2 comprising reactive ion etching at a gas pressure of 0.5Pa through 1Pa.

10. (Previously presented) The method according to Claim 3 comprising reactive ion etching at a gas pressure of 0.5Pa through 1Pa.

11. (Previously presented) The method according to Claim 2 comprising activating the gas by means of a radio frequency.

12. (Previously presented) The method according to Claim 3 comprising activating the gas by means of a radio frequency.

13. (Previously presented) The method according to claim 1, comprising:

synthesizing polycrystalline ZnSe from Zn and $H_2Se$; and

cutting the ZnSe polycrystalline substrate out of the synthesized polycrystalline ZnSe, wherein the DOE is for a $CO_2$ gas laser.